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**TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A  
FILING UNDER 35 U.S.C. 371**

225/44905

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/214069

INTERNATIONAL APPLICATION NO.  
PCT/EP 97/02753

INTERNATIONAL FILING DATE  
5/28/97

PRIORITY DATE CLAIMED  
6/26/96

TITLE OF INVENTION  
LIMITED-OPENING DOOR HINGE

APPLICANT(S) FOR DO/EO/US  
HANS KUEHL


Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ has been transmitted by the International Bureau
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) (**unexecuted**).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

**Item 11. to 16. below concern other document(s) or information included:**

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.  
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☒ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

First page of published PCT application  
International Search Report  
Preliminary Examination Report  
One sheet of drawings  
PCT/RO/105  
PCT/RO/101

U.S. APPLICATION NO (if known, see 37 CFR 1.5)		INTERNATIONAL APPLICATION NO PCT/EP 97/02753		ATTORNEY'S DOCKET NUMBER 225/44905																								
17. <input type="checkbox"/> The following fees are submitted: Basic National Fee (37 CFR 1.492(a)(1)-(5)):  Search Report has been prepared by the EPO or JPO ..... \$840.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... \$670.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482)  but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$760.00 Neither international preliminary examination fee (37 CFR 1.482) nor  international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$ 970.00 International preliminary examination fee paid to USPTO (37 CFR 1.482)  and all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$96.00  <b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>CALCULATIONS</b>	<b>PTO USE ONLY</b>																							
				Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)). <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Claims</th> <th style="width: 20%;">Number Filed</th> <th style="width: 20%;">Number Extra</th> <th style="width: 20%;">Rate</th> <th style="width: 20%;"></th> </tr> </thead> <tbody> <tr> <td>Total Claims</td> <td>4-20=</td> <td></td> <td>X \$18.00</td> <td>\$</td> </tr> <tr> <td>Independent Claims</td> <td>2-3=</td> <td></td> <td>X \$78.00</td> <td>\$</td> </tr> <tr> <td colspan="3">Multiple dependent claims(s) (if applicable)</td> <td>+ \$260.00</td> <td>\$</td> </tr> <tr> <td colspan="4" style="text-align: right;"><b>TOTAL OF ABOVE CALCULATIONS =</b></td> <td>\$840.00</td> </tr> </tbody> </table> Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).  <div style="text-align: right;"><b>SUBTOTAL =</b></div> Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). <div style="text-align: right;"><b>TOTAL NATIONAL FEE =</b></div> Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property + <div style="text-align: right;"><b>TOTAL FEE ENCLOSED =</b></div>		Claims	Number Filed	Number Extra	Rate		Total Claims	4-20=		X \$18.00	\$	Independent Claims	2-3=		X \$78.00	\$	Multiple dependent claims(s) (if applicable)			+ \$260.00	\$	<b>TOTAL OF ABOVE CALCULATIONS =</b>		
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a. <input checked="" type="checkbox"/> A check in the amount of \$840.00 to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees, which may be required, or credit any overpayment to Deposit Account No. <u>05-1323</u> . A duplicate copy of this sheet is enclosed.																												
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.																												
SEND ALL CORRESPONDENCE TO: Evenson, McKeown, Edwards & Lenahan, P.L.L.C. 1200 G Street, N.W., Suite 700 Washington, D.C. 20005 Tel. No. (202) 628-8800 Fax No. (202) 628-8844																												
				 SIGNATURE Donald D. Evenson NAME 26,160 REGISTRATION NUMBER 12/23/98 DATE																								

Attorney Docket: 225/44905  
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: HANS KUEHL ET AL.

Serial No.: Not Yet Assigned

Filed: DECEMBER 26, 1998

Title: LIMITED-OPENING DOOR HINGE

PRELIMINARY AMENDMENT

Box PCT

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

The following amendments are submitted preliminary to an action on the merits.

IN THE CLAIMS:

Please amend the claims as follows:

1. (Amended) Hinge for motor vehicle doors having a swivel catch comprising, [in particular doors for motor vehicles, in which the] a hinge pin[, in] with a first axial region[, ] and [also the] a first hinge plate, [are provided with] the first hinge pin and hinge plate having mutually matching profiles in the form of a plurality of wedge-shaped cams which protrude radially outwards or inwards, respectively beyond imaginary cylindrical surfaces on the hinge pin or in the hinge plate[, respectively,]; the profiles are offset [by the same angle] in [the] a circumferential direction by matching angles and taper

[off] steeply [again] onto the cylindrical surfaces, [characterized in that] wherein the hinge pin (4) [, in] has a second axial region (7), and [the] a second hinge plate (3) [likewise have] having mutually matching second profiles (12, 13; 18) [which can be released from one another and can] adapted to be releasable and to be held in captive engagement [captively to one another].

2. Hinge according to Claim 1, [characterized in that] wherein the second profiles in the second axial region (7) of the hinge pin (4) and in the second hinge plate (3) are [in the form of] formed as conical surfaces (12, 13).

3. Hinge according to Claim 1, [characterized in that] wherein the second profiles in the second axial region (7) of the hinge pin (4) and in the second hinge plate (3) are designed as axially parallel [toothings] teeth (18).

Please add the following claim:

--4. A door hinge having a swivel catch comprising:

a hinge pin having a first axial region;

a first hinge plate, said first hinge pin and first hinge plate having matching first profiles formed as a plurality of wedge-shaped cams, said cams being offset in a circumferential direction by matching angles and tapering to cylindrical surfaces;

said hinge pin having a second axial region and second hinge plate having mutually matching second profiles, said second

Serial No. Not Yet Assigned

hinge plate and said hinge pin being releaseably coupled in captive engagement.--

IN THE ABSTRACT

Please substitute the new Abstract of the Disclosure submitted herewith on a separate page for the original Abstract presently in the application.

REMARKS

Entry of the amendments to the specification, claims and abstract before examination of the application is respectfully requested.

If there are any questions regarding this Preliminary Amendment or this application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

December 23, 1998

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Respectfully submitted,



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Edward V. Charbonneau  
Registration No. 35,478

--ABSTRACT OF THE DISCLOSURE

The invention relates to a hinge having a swivel catch in the form of circular wedge profiles on the hinge pin and on the hinge plate 2 which swivels around the hinge pin. The angular position of these profiles with respect to one another determines the inhibiting effect. To adjust and securely retain the hinge pin in the hinge plate which bears it, the bearing surfaces of the hinge pin and of the hinge plate are provided with mutually matching profiles. A conical shape or teeth is proposed for these profiles.--

[HINGE FOR DOORS HAVING A SWIVEL CATCH] LIMITED-OPENINGDOOR HINGEBACKGROUND AND SUMMARY OF THE INVENTION

5 The invention relates to a hinge for doors having a  
swivel catch[, in particular]. More particularly, the  
10 invention relates to doors for motor vehicles[, in which  
the hinge pin[, in a first axial region[, and [also]  
the hinge plate[, in] which [it] can be rotated, are  
provided with mutually matching profiles in the form of a  
15 plurality of wedge-shaped cams[which]. The cams protrude  
radially outwards or inwards beyond imaginary cylindrical  
surfaces on the pin or in the hinge plate,  
respectively[,]. The cams are offset by the same angle  
in the circumferential direction and taper off steeply  
again onto the cylindrical surfaces.

Swivelling doors frequently have a swivel catch  
which is intended to inhibit the free swivelling of the  
door[to the extent that]. That is, the door  
automatically remains in at least one open position  
20 and/or that its swivelling movement is retarded to such  
an extent that it cannot slam to by itself.

Provision is thus made, in particular in the case of  
car doors, that they lock into place when swivelled fully  
open [to the full extent] and can only be swivelled out  
25 of this lock with increased effort. The door also  
frequently [also] has a further locking position at a  
smaller opening angle. The locking effect is designed  
such that the door, when the vehicle is standing on a  
slope within customary limits, cannot start to move by  
30 itself and slam to.

For this purpose, the door has a special component  
which is generally termed a door arrester. This component  
requires [an] additional [outlay] costs on design and  
manufacture. A car door, especially, with the frequent  
35 opening and closing is also subject to considerable wear  
and so the intended locking and braking effect is not

ensured indefinitely.

[It has already been proposed (DE 44 06 824 C) proposes to integrate the function of this component into the hinge of the door. In this case, [provision is made for] the pin of the hinge, in a first axial region, and also [that] the hinge plate [in] which [it] can be rotated, [to be] are provided with mutually matching profiles. The profiles are in the form of a plurality of wedge-shaped cams which protrude radially outwards or inwards beyond imaginary cylindrical surfaces on the pin or in the hinge plate, respectively[,]. The cams are offset by the same angle in the circumferential direction and taper off steeply again onto the cylindrical surfaces.

In the event of wear of these profiles, the hinge can be readjusted[in so far as the]. The inhibiting effect of the mutually matching profiles is produced again by correspondingly changing their angular position with respect to one another. For this purpose, the hinge pin [has to be] is rotatable with respect to the hinge plate, forming [the] a swivel bearing [with it] therewith. On the other hand, however, it also has to be fastened in this hinge plate in a rotationally fixed manner such that it cannot rotate unintentionally. The intended inhibiting effect would, as a result, be missing.

[The] An object of the present invention [was] is to specify a simple solution for fastening the hinge pin in the hinge plate bearing it[, which]. This solution permits the fastening position of the hinge pin in this hinge plate to be changed, preferably continuously but at least sensitively, and also to be reliably observed. The invention achieves this object by means of [the features mentioned in the characterizing part of the main claim] a hinge pin and hinge plate having matching profiles in the



form of a plurality of wedge-shaped cams.

In a first embodiment, profiles of this type can be designed as cones whose axes lie coaxially to the swivelling axis of the hinge. This profile shape permits infinitely variable changing of the angular position of the hinge pin in the hinge plate. In this case, however, since there is only frictional engagement, unintentional changing of the position of the hinge pin in the hinge plate cannot be ruled out under the effect of unusually high moments[, or if the clamping becomes loose[, is not entirely ruled out].

In order to ensure absolutely captive fastening of the hinge pin in the hinge plate, provision is made in a further embodiment to design the profiles as intermeshing [toothings] teeth.

Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

In the figures of the drawing the two embodiments are represented using the example of a hinge for a car door. Of course, the invention can also be used on hinges for other applications. In the drawings:

Fig. 1 shows the partially broken-away view of a first embodiment of the hinge according to the invention;

Fig. 2 shows the partially broken-away view of a second embodiment of the hinge according to the invention.

#### **DETAILED DESCRIPTION OF THE DRAWINGS**

[The] As shown in Fig. 1, the hinge 1 has a first hinge plate 2 and a second hinge plate 3 which are connected to one another by a hinge pin 4. [By the] The hinge 1 is fastened, on one side of the hinge plates 2

and 3, to the body of a vehicle, and a door is fastened on the other side by means of screws which grasp through the holes 5[,]. The hinge pin 4 rotates in a first axial region 6 in the hinge plate 2[and]. Hinge pin 4 is fastened in a second axial region 7 in the other hinge plate 3.

The first axial region 6 of the hinge pin 4 and the bearing hole assigned thereto in the hinge plate 2 have mutually matching profiles 8 and 9, respectively[,].  
Profiles 8 and 9 are in the form of a plurality of wedge-shaped cams which protrude radially outwards or inwards beyond imaginary cylindrical surfaces on the hinge pin or in the hinge plate, respectively[,]. Profiles 8 and 9 are offset by the same angle in the circumferential direction and taper off steeply again onto the cylindrical surfaces. The rising incline of the cams and the angular position of the parts containing the profiles 8, 9 are selected such that, when the door swivels open, the surface pressure between the cams sliding onto one another increases until the swivelling movement is inhibited. A detailed description and representation of the design and manner of operation of a shaft/hub connection of this type is contained in DE 42 09 153 C2 which is mentioned in the introduction and [to] which is herein incorporated by reference [is made to this extent].

A nut 10, which can be screwed [onto that] the threaded end region of the hinge pin 4, [which is formed as a thread,] secures the hinge pin in the hinge plate 2 in interaction with a collar 11.

In the first embodiment of the invention according to Fig. 1, the profiles of the second axial region 7 of the hinge pin 4 and the bearing hole in the hinge plate 3 are of conical design. The conical surfaces 12 and 13 can be pressed [one into the other] together by means of a

fastening screw 14[, with the result that the]. The  
hinge pin 4 and the hinge plate 3 are connected to one  
another non-positively in a rotationally fixed manner.  
The angle of taper, which for clarity is shown sharply  
5 exaggerated in the drawing, can be small so that, under a  
high surface pressure, a high retaining force against  
rotation can be achieved.

When the door is swivelled, the hinge pin 4 is  
rotated in the hinge plate 2. At the same time, the  
10 wedged surfaces of the profiles 8 and 9 slide on one  
another and progressively increase the frictional  
engagement between the parts. As a result, the swivelling  
movement is progressively inhibited. The extent of this  
inhibition can be changed, with the door closed, by  
15 rotating the hinge pin 4 into another starting position  
and can be readjusted in the event of wear.

For this purpose, by loosening the screw 14, the fit  
of the conical surfaces 12, 13 is loosened and the hinge  
pin 4 is rotated, using a tool which engages over the  
20 circumference of the collar 11 at a key surface 15, to  
such an extent that the intended inhibiting effect [comes  
about] occurs. To secure this new position of the hinge  
pin 4, the conical surfaces 12, 13 are pressed one into  
the other again in the new mutual position by tightening  
25 the fastening screw 14.

In the embodiment of Fig. 2, the hinge pin 4 is  
secured in the hinge plate 2 by means of a clamping ring  
16, and in the hinge plate 3 by means of a nut 17 which  
can be screwed onto a thread at the upper end of the  
30 hinge pin. To secure the angular position between the  
hinge plate 3 and hinge pin 4, [use is made here of] a  
profile in the form of [a toothing] teeth 18 on the  
second axial region 7 of the hinge pin 4 and in the hole  
in the hinge plate 3 is used. [This] The intermeshing  
35 [toothings] teeth 18 may be designed as a serration.

To change the rotational position of the hinge pin 4 in the hinge plate 3, [after] the nut 17 [has been] is loosened[, the]. The hinge plate 3 is then pulled off from the hinge pin, i.e. the door is lifted up. The hinge pin 4 can then be rotated using a tool acting on the key surface 15. When this has happened, the hinge plate 3 is again placed onto the hinge pin 4, the [toothings] teeth 18 intermeshing in another position. Finally, the hinge plate 3 is fastened again on the hinge pin 4 by means of the nut 17.

Since [the toothings] teeth 18 have to have a joining clearance, the hinge pin 4 and the hole in the hinge plate 3 are provided, at least on one side, with conical shoulders 19 [by means of which]. Shoulders 19 ensure the parts can be braced against one another as the nut 17 is being tightened and are prevented from rattling. The conical shoulder 19 which is adjacent to the nut 17 is arranged in a separate part 20 which can be placed onto the hinge pin 4.

The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.

LIMITED-OPENING DOOR HINGEBACKGROUND AND SUMMARY OF THE INVENTION

5 The invention relates to a hinge for doors having a swivel catch. More particularly, the invention relates to doors for motor vehicles in which the hinge pin in a first axial region and the hinge plate which can be rotated, are provided with mutually matching profiles in the form of a plurality of wedge-shaped cams. The cams protrude radially outwards or inwards beyond imaginary cylindrical surfaces on the pin or in the hinge plate, respectively. The cams are offset by the same angle in the circumferential direction and taper off steeply again onto the cylindrical surfaces.

10 Swivelling doors frequently have a swivel catch which is intended to inhibit the free swivelling of the door. That is, the door automatically remains in at least one open position and/or that its swivelling movement is retarded to such an extent that it cannot slam to by itself.

15 Provision is thus made, in particular in the case of car doors, that they lock into place when swivelled fully open and can only be swivelled out of this lock with increased effort. The door also frequently has a further locking position at a smaller opening angle. The locking effect is designed such that the door, when the vehicle is standing on a slope within customary limits, cannot start to move by itself and slam to.

20 For this purpose, the door has a special component which is generally termed a door arrester. This component requires additional costs on design and manufacture. A car door, especially, with the frequent opening and closing is also subject to considerable wear and so the intended locking and braking effect is not ensured indefinitely.

25 (DE 44 06 824 C) proposes to integrate the function of this component into the hinge of the door. In this case, the pin of the hinge, in a first axial region, and also the

hinge plate which can be rotated, are provided with mutually matching profiles. The profiles are in the form of a plurality of wedge-shaped cams which protrude radially outwards or inwards beyond imaginary cylindrical surfaces on the pin or in the hinge plate, respectively. The cams are offset by the same angle in the circumferential direction and taper off steeply again onto the cylindrical surfaces.

In the event of wear of these profiles, the hinge can be readjusted. The inhibiting effect of the mutually matching profiles is produced again by correspondingly changing their angular position with respect to one another. For this purpose, the hinge pin is rotatable with respect to the hinge plate, forming a swivel bearing therewith. On the other hand, however, it also has to be fastened in this hinge plate in a rotationally fixed manner such that it cannot rotate unintentionally. The intended inhibiting effect would, as a result, be missing.

An object of the present invention is to specify a simple solution for fastening the hinge pin in the hinge plate bearing it. This solution permits the fastening position of the hinge pin in this hinge plate to be changed, preferably continuously but at least sensitively, and also to be reliably observed. The invention achieves this object by means of a hinge pin and hinge plate having matching profiles in the form of a plurality of wedge-shaped cams.

In a first embodiment, profiles of this type can be designed as cones whose axes lie coaxially to the swivelling axis of the hinge. This profile shape permits infinitely variable changing of the angular position of the hinge pin in the hinge plate. In this case, however, since there is only frictional engagement, unintentional changing

of the position of the hinge pin in the hinge plate cannot be ruled out under the effect of unusually high moments or if the clamping becomes loose.

5 In order to ensure absolutely captive fastening of the hinge pin in the hinge plate, provision is made in a further embodiment to design the profiles as intermeshing teeth.

10 Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

15 In the figures of the drawing the two embodiments are represented using the example of a hinge for a car door. Of course, the invention can also be used on hinges for other applications. In the drawings:

Fig. 1 shows the partially broken-away view of a first embodiment of the hinge according to the invention;

20 Fig. 2 shows the partially broken-away view of a second embodiment of the hinge according to the invention.

#### **DETAILED DESCRIPTION OF THE DRAWINGS**

25 As shown in Fig. 1, the hinge 1 has a first hinge plate 2 and a second hinge plate 3 which are connected to one another by a hinge pin 4. The hinge 1 is fastened, on one side of the hinge plates 2 and 3, to the body of a vehicle, and a door is fastened on the other side by means of screws which grasp through the holes 5. The hinge pin 4 rotates in a first axial region 6 in the hinge plate 2. Hinge pin 4 is fastened in a second axial region 7 in the  
30 other hinge plate 3.

The first axial region 6 of the hinge pin 4 and the bearing hole assigned thereto in the hinge plate 2 have mutually matching profiles 8 and 9, respectively. Profiles 8 and 9 are in the form of a plurality of wedge-shaped cams  
35 which protrude radially outwards or inwards beyond

imaginary cylindrical surfaces on the hinge pin or in the hinge plate, respectively. Profiles 8 and 9 are offset by the same angle in the circumferential direction and taper off steeply again onto the cylindrical surfaces. The rising incline of the cams and the angular position of the parts containing the profiles 8, 9 are selected such that, when the door swivels open, the surface pressure between the cams sliding onto one another increases until the swivelling movement is inhibited. A detailed description and representation of the design and manner of operation of a shaft/hub connection of this type is contained in DE 42 09 153 C2 which is mentioned in the introduction and which is herein incorporated by reference.

A nut 10, which can be screwed the threaded end region of the hinge pin 4, secures the hinge pin in the hinge plate 2 in interaction with a collar 11.

In the first embodiment of the invention according to Fig. 1, the profiles of the second axial region 7 of the hinge pin 4 and the bearing hole in the hinge plate 3 are of conical design. The conical surfaces 12 and 13 can be pressed together by means of a fastening screw 14. The hinge pin 4 and the hinge plate 3 are connected to one another non-positively in a rotationally fixed manner. The angle of taper, which for clarity is shown sharply exaggerated in the drawing, can be small so that, under a high surface pressure, a high retaining force against rotation can be achieved.

When the door is swivelled, the hinge pin 4 is rotated in the hinge plate 2. At the same time, the wedged surfaces of the profiles 8 and 9 slide on one another and progressively increase the frictional engagement between the parts. As a result, the swivelling movement is progressively inhibited. The extent of this inhibition can



be changed, with the door closed, by rotating the hinge pin 4 into another starting position and can be readjusted in the event of wear.

For this purpose, by loosening the screw 14, the fit of the conical surfaces 12, 13 is loosened and the hinge pin 4 is rotated, using a tool which engages over the circumference of the collar 11 at a key surface 15, to such an extent that the intended inhibiting effect occurs. To secure this new position of the hinge pin 4, the conical surfaces 12, 13 are pressed one into the other again in the new mutual position by tightening the fastening screw 14.

In the embodiment of Fig. 2, the hinge pin 4 is secured in the hinge plate 2 by means of a clamping ring 16, and in the hinge plate 3 by means of a nut 17 which can be screwed onto a thread at the upper end of the hinge pin. To secure the angular position between the hinge plate 3 and hinge pin 4, a profile in the form of teeth 18 on the second axial region 7 of the hinge pin 4 and in the hole in the hinge plate 3 is used. The intermeshing teeth 18 may be designed as a serration.

To change the rotational position of the hinge pin 4 in the hinge plate 3, the nut 17 is loosened. The hinge plate 3 is then pulled off from the hinge pin, i.e. the door is lifted up. The hinge pin 4 can then be rotated using a tool acting on the key surface 15. When this has happened, the hinge plate 3 is again placed onto the hinge pin 4, the teeth 18 intermeshing in another position. Finally, the hinge plate 3 is fastened again on the hinge pin 4 by means of the nut 17.

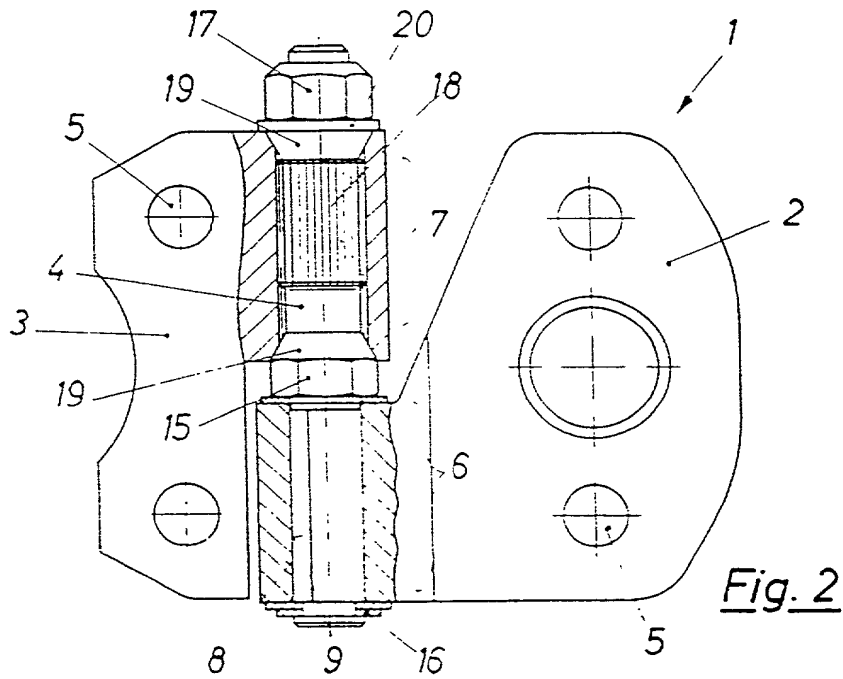
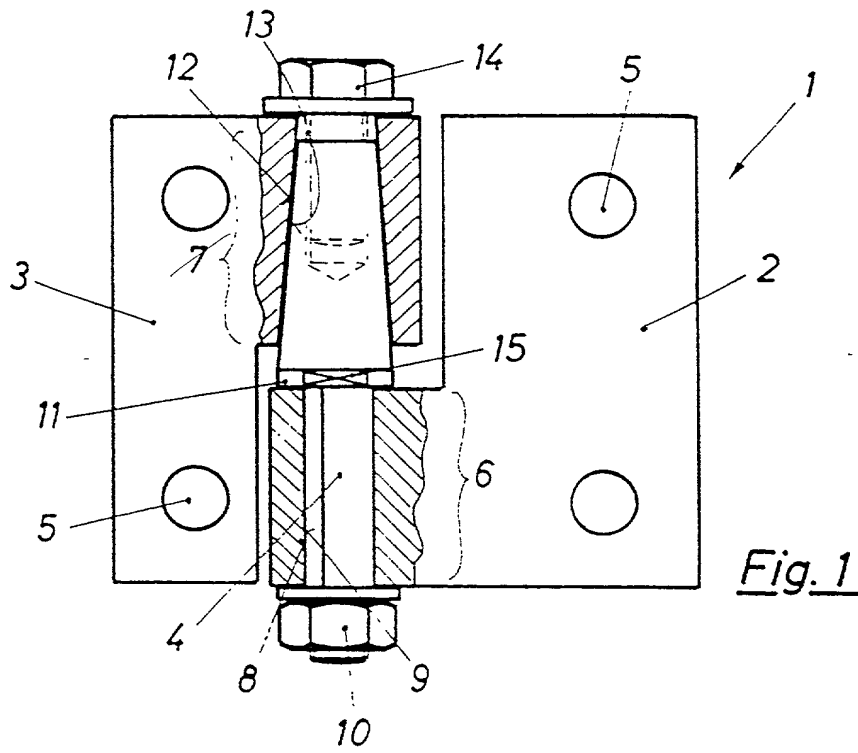
Since teeth 18 have to have a joining clearance, the hinge pin 4 and the hole in the hinge plate 3 are provided, at least on one side, with conical shoulders 19. Shoulders 19 ensure the parts can be braced against one another as the nut 17 is being tightened and are prevented from rattling. The conical shoulder 19 which is adjacent to

the nut 17 is arranged in a separate part 20 which can be placed onto the hinge pin 4.

The foregoing disclosure has been set forth merely to illustrate the invention and is not intended to be limiting. Since modifications of the disclosed embodiments incorporating the spirit and substance of the invention may occur to persons skilled in the art, the invention should be construed to include everything within the scope of the appended claims and equivalents thereof.

10

1/1



Handwritten notes:

16. 11.

2. 11. 11.

# DECLARATION AND POWER OF ATTORNEY - PATENT APPLICATION

As a below named inventor, I hereby declare that my citizenship, postal address and residence are as stated below; that I verily believe I am the original, first and sole inventor (if only one inventor is named below) or a joint inventor (if plural inventors are named below) of the invention entitled:

## LIMITED-OPENING DOOR HINGE

the specification of which

X is attached hereto, or  
\_\_\_\_\_ was filed on \_\_\_\_\_ as Application No. \_\_\_\_\_ and was amended on \_\_\_\_\_  
\_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to be material to patentability as defined in 37 CFR §1.56. I hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)	Priority Claimed
<u>196 25 557.0</u> (Number)	<u>Germany</u> (Country)
<u>26 June 1996</u> (Day/Month/Year)	<u>Yes</u>
_____ (Number)	_____ (Country)
_____ (Day/Month/Year)	_____

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose all information known to be material to patentability as defined in 37 CFR §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

<u>PCT/EP97/02753</u> (Application Serial No.)	<u>28 May 1997</u> (Filing Date)	<u>pending</u> (Status)
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I hereby appoint as principal attorneys Martin Fleit, Reg. No. 16,900; Herbert I. Cantor, Reg. No. 24,392; James F. McKeown, Reg. No. 25,406; Donald D. Evenson, Reg. No. 26,160; Joseph D. Evans, Reg. No. 26,269; Gary R. Edwards, Reg. No. 31,824; Jeffrey D. Sanok, Reg. No. 32,169; Richard R. Diefendorf, Reg. No. 32,390; and Paul A. Schnose, Reg. No. 39,361, to prosecute and transact all business in the Patent and Trademark Office connected with this application and any related United States and international applications. Please direct all communications to:

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Facsimile: (202) 628-8844

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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